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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
VERDIER, CHRISTOPHER M	
ART UNIT	**PAPER NUMBER**
3745	9

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No.	Applicant(s)	
	10/028,145	LEE ET AL.	
	Examiner	Art Unit	
	Christopher Verdier	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Applicants' Amendment dated September 12, 2003 has been carefully considered but is deemed non-persuasive. Claims 1-2 and 4-12 are pending.

With regard to Andersen, Applicants have argued (page 5, lines 1-19 of Applicants' Remarks) that the metal sleeve 58 in Andersen is not a "high temperature foil" as is disclosed on page 4, lines 13-18 of the specification, with the special meaning of a structure made from an alloy with improved strength and oxidation resistance over conventional superalloys at temperature above 1093 degrees C (2000 degrees F) and capable of being formed to a thickness of about 0.51 mm (0.020 inches or less). The examiner agrees with this argument and the rejection of claims 1 and 7 under 35 USC 102(b) as being anticipated by Andersen is withdrawn. However, it would be obvious to form metal sleeve 58 of Andersen from such a high temperature foil as taught by either Chandley or Craig, for the reasons set forth later below. Furthermore, the metal sleeve 58 of Andersen appears to be very thin relative to the airfoil, and selecting a specific thickness would be obvious to one of ordinary skill in the art, since Applicant has not disclosed that the specific thickness in the specification of about 0.51 mm (0.020 inches or less) is critical.

With regard to Applicants' arguments that claims 1 and 7 have been amended to recite that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, and that this feature defines over Andersen, the examiner disagrees. Column 5, line 45 and column 6, lines 1-2 of Andersen, which refer to the sheet metal sleeve 58, state that a full circumferential band is neither required nor desired in some instances. Japanese Patent 64-53,002 (figures 1a-1c) shows an airfoil 1 and teaches that a metal sheath 3

(which is an outer wall) has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid.

Applicants' arguments with regard to Chandley, Mizuhara, Lee '102, and Craig have been considered and are that none of these references disclose an outer wall having a first end of the outer wall that is adjacent to the leading edge and a second end of the outer wall that is adjacent to the trailing edge. These arguments are moot in view of the teachings of Japanese Patent 64-53,002. With regard to the double patenting rejections based on U.S. Patent 6,551,063 set forth in the previous Office action, the examiner agrees with Applicants that the claims have been amended to overcome the double patenting rejections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Japanese Patent 64-53,002 and Chandley 3,423,069. Andersen discloses an airfoil 20 substantially as claimed including a root 16, a tip near 46, a leading edge 26, a trailing edge 28, a first wall 44 extending from the leading edge to the trailing edge, a second wall 42 extending from the leading edge to the trailing edge, with the second wall 42 having ribs 55 extending therefrom, and outer wall 58 disposed in spaced apart relationship with the second wall 42 and attached to the ribs 55, with the outer wall comprising a foil. The outer wall is spaced apart from the second wall interior periphery, due to the presence of slots 54. An interface layer in the form of brazing material is disposed between the ribs 55 and the foil outer wall 58. Note suction side tip wall 42 and pressure side tip wall 44. The pressure side tip wall 44 is offset from the pressure side wall 24 to define a tip shelf near 56 extending circumferentially and having at least one rib 55 extending therefrom. The outer tip wall 58 is disposed on the pressure side of the tip in spaced apart relation with the pressure side tip wall 44. However, Andersen does not disclose that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, and does not disclose that foil 58 is a high temperature foil as given the special meaning defined in the specification (an alloy with improved strength and oxidation resistance over conventional superalloys at

temperature above 1093 degrees C (2000 degrees F) and capable of being formed to a thickness of about 0.51 mm (0.020 inches or less)), with the foil comprising rhodium-based alloy.

Japanese Patent 64-53,002 (figures 1a-1c) shows a turbine blade in the form of an airfoil 1 having an metal sheath 3 (which is an outer wall) which has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil. Column 5, line 45 and column 6, lines 1-2 of Andersen, which refer to the sheet metal sleeve 58, state that a full circumferential band is neither required nor desired in some instances.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the sleeve 58 of Andersen such that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, as taught by Japanese Patent 64-53,002, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil.

Chandley (figure 2) shows an airfoil 10 for a high temperature gas turbine engine having a shield 28 made of platinum/rhodium alloy, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the leading edge region. Column 4, lines 33-38 state that the shield material provides corrosion resistance and high strength at high temperatures.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen such that the foil is of platinum/rhodium alloy, as taught by Chandley, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the airfoil. With regard to Applicant's specific definition in the specification of the high temperature foil being capable of being formed to a thickness of about 0.51 mm (0.020 inches or less), sleeve 58 of Andersen appears to be very thin relative to the airfoil, and it would have been obvious to one of ordinary skill in the art to select the thickness to a specific value, such as about 0.51 mm (which appears to be within the range of conventional commercial sheet metal), since Applicant has not disclosed that such a specific thickness is critical, or solves any stated problem or is for any stated purpose, and it appears that the modified airfoil of Andersen would perform equally as well with metal sleeves of differing thicknesses.

Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Chandley as applied to claims 1 and 9, respectively above, and further in view of Mizuhara 4,447,391. The modified airfoil of Andersen shows all of the claimed subject matter except for the interface layer comprising chromium, palladium, and nickel.

Mizuhara 4,447,391 shows a brazing alloy containing specific amounts of chromium, palladium, and nickel, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to utilize a brazing alloy of chromium, palladium, and nickel for the interface layer in Andersen, as taught by Mizuhara, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Chandley and Mizuhara as applied to claim 4 above, and further in view of Lee 5,733,102. The modified airfoil of Andersen shows all of the claimed subject matter including first and second walls 44, 42, respectively, but does not show that the first and second walls are made of a nickel-base superalloy.

Lee 5,733,102 (figure 1) shows a turbine blade having first and second walls 24, 26, made of a nickel-base superalloy, for the purpose of providing suitable strength at high temperature operation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen 4,142,824 such that the first and

second walls of the airfoil are made of a nickel-base superalloy, as taught by Lee 5,733,102, for the purpose of providing suitable strength at high temperature operation.

Claims 1, 6-7, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Japanese Patent 64-52,03 and Craig 4,501,053. Andersen 4,142,824 discloses an airfoil 20 substantially as claimed including a root 16, a tip near 46, a leading edge 26, a trailing edge 28, a first wall 44 extending from the leading edge to the trailing edge, a second wall 42 extending from the leading edge to the trailing edge, with the second wall 42 having ribs 55 extending therefrom, and outer wall 58 disposed in spaced apart relationship with the second wall 42 and attached to the ribs 55, with the outer wall comprising a foil. The outer wall is spaced apart from the second wall interior periphery, due to the presence of slots 54. An interface layer in the form of brazing material is disposed between the ribs 55 and the foil outer wall 58. Note suction side tip wall 42 and pressure side tip wall 44. The pressure side tip wall 44 is offset from the pressure side wall 24 to define a tip shelf near 56 extending circumferentially and having at least one rib 55 extending therefrom. The outer tip wall 58 is disposed on the pressure side of the tip in spaced apart relation with the pressure side tip wall 44. However, Andersen does not disclose that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, and does not disclose that foil 58 is a high temperature foil as given the special meaning defined in the specification (an alloy with improved strength and oxidation resistance over conventional superalloys at temperature above 1093 degrees C (2000 degrees F) and capable of being formed to a thickness of about 0.51 mm (0.020 inches or less)), with the foil comprising a nickel-based alloy.

Japanese Patent 64-53,002 (figures 1a-1c) shows a turbine blade in the form of an airfoil 1 having an metal sheath 3 (which is an outer wall) which has a first unnumbered end that is adjacent to the leading edge and a second unnumbered end that is adjacent to the trailing edge, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil. Column 5, line 45 and column 6, lines 1-2 of Andersen, which refer to the sheet metal sleeve 58, state that a full circumferential band is neither required nor desired in some instances.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the sleeve 58 of Andersen such that a first end of the outer wall is adjacent to the leading edge and a second end of the outer wall is adjacent to the trailing edge, as taught by Japanese Patent 64-53,002, for the purpose of protecting the airfoil from hot working fluid along the pressure and suction sides of the airfoil.

Craig 4,501,053 (figures 3 and 5) shows a turbine blade having a shell 34 in the form of a nickel-base superalloy (see column 6, lines 5-17), for the purpose of providing the turbine blade with good resistance to corrosion and high strength at elevated temperatures.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified foil of Andersen of a nickel-base alloy, as taught by Craig, for the purpose of providing good resistance to corrosion and high strength at elevate

temperatures. With regard to Applicant's specific definition in the specification of the high temperature foil being capable of being formed to a thickness of about 0.51 mm (0.020 inches or less), sleeve 58 of Andersen appears to be very thin relative to the airfoil, and it would have been obvious to one of ordinary skill in the art to select the thickness to a specific value, such as about 0.51 mm (which appears to be within the range of conventional commercial sheet metal), since Applicant has not disclosed that such a specific thickness is critical, or solves any stated problem or is for any stated purpose, and it appears that the modified airfoil of Andersen would perform equally as well with metal sleeves of differing thicknesses.

Claim 4 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Craig as applied to claim 1 above, and further in view of Mizuhara 4,447,391. The modified airfoil of Andersen shows all of the claimed subject matter except for the interface layer comprising chromium, palladium, and nickel.

Mizuhara 4,447,391 shows a brazing alloy containing specific amounts of chromium, palladium, and nickel, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to utilize a brazing alloy of chromium, palladium, and nickel for the interface layer in Andersen, as taught by Mizuhara, for the purpose of providing improved corrosion and oxidation resistance in the brazing alloy.

Claim 5 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Craig and Mizuhara as applied to claim 4 above, and further in view of Lee 5,733,102. The modified airfoil of Andersen shows all of the claimed subject matter including first and second walls 44, 42, respectively, but does not show that the first and second walls are made of a nickel-base superalloy.

Lee 5,733,102 (figure 1) shows a turbine blade having first and second walls 24, 26, made of a nickel-base superalloy, for the purpose of providing suitable strength at high temperature operation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen 4,142,824 such that the first and second walls of the airfoil are made of a nickel-base superalloy, as taught by Lee 5,733,102, for the purpose of providing suitable strength at high temperature operation.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen and Japanese Patent 64-53,002 and Chandley and Mizuhara as applied to claim 10 above, and further in view of Lee 5,733,102. The modified airfoil of Andersen shows all of the claimed subject matter including first and second walls 44, 42, respectively, but does not show that the pressure side tip wall is made of a nickel-base superalloy.

Lee 5,733,102 (figure 1) shows a turbine blade having a pressure side tip wall 24/38a, made of a nickel-base superalloy, for the purpose of providing suitable strength at high temperature operation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Andersen 4,142,824 such that the pressure side tip wall of the airfoil is made of a nickel-base superalloy, as taught by Lee 5,733,102, for the purpose of providing suitable strength at high temperature operation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (703)-308-2638. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (703) 308-1044. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

Christopher Verdier
Primary Examiner
Art Unit 3745

C.V.
October 3, 2003